

PATENT ABSTRACTS OF JAPAN

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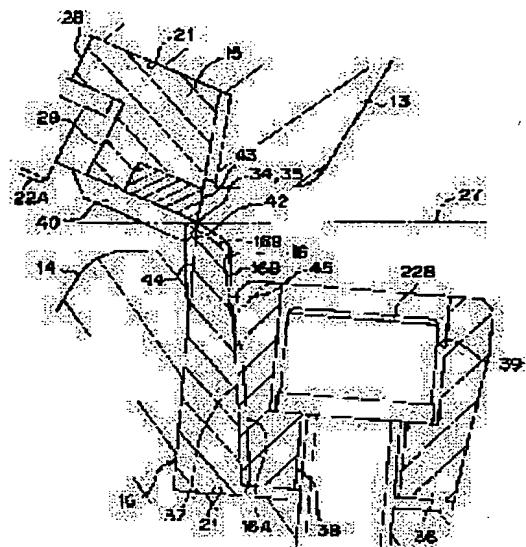
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(54) CUTTING DEVICE**(57)Abstract:**

PROBLEM TO BE SOLVED: To prevent the generation of chips and the like, as well as to improve the cutting quality of a base material.

SOLUTION: In a cutting device to cut a base material 27 by a pair of the upper blade 15 and the lower blade 16 by engaging their edges 34 and 35 in the longitudinal direction of the blades for a while, a guide member 40 is provided to the upper blade, at the position to engage with the edge of the lower blade at first, and this guide member guides the edge of the lower blade to contact to the edge of the upper blade, as well as gives a contact pressure which can contact to the upper blade, to the lower blade, by bending-deforming the lower blade in the blade thickness direction.

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CLAIMS

[Claim(s)]

[Claim 1] In the cutting equipment with which the cutting edge of a pair cuts a base material by engaging those edge of a blade gradually to the longitudinal direction of the above-mentioned cutting edge with the cutting edge of the above-mentioned pair Cutting-edge guidance admission into a club is prepared in the location which gears with the edge of a blade of the cutting edge of above-mentioned another side to the beginning. This cutting-edge guidance admission into a club Cutting equipment characterized by showing around in order to contact the edge of a blade of the cutting edge of this another side to the edge of a blade of the method of top Norikazu while making the cutting edge of above-mentioned another side bend and transform in the direction of edge thickness and giving the contact pressure force in which it can contact to the cutting edge of this another side, to the cutting edge of the method of top Norikazu.

[Claim 2] The above-mentioned cutting edge is cutting equipment according to claim 1 which is the spiral cutting edge with which the above-mentioned cutting equipment is cutting equipment of the rotary type which installed the cutting edge in the periphery section of each of the drum of a pair which rotates to an opposite direction mutually, and inclination arrangement of the longitudinal direction was carried out to the shaft orientations of the above-mentioned drum.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the cutting equipment which cuts base materials, such as the paper board and a griddle.

[0002]

[Description of the Prior Art] With the cutting equipment which cuts base materials, such as the paper board and a griddle, by engaging an upper cutting edge and a lower cutting edge, in order that the upper cutting edge and lower cutting edge which are a metal cutting edge may generally prevent that it contacts and is missing, the clearance is set up between the double-edged swords at the time of tabling.

[0003] For example, the upper cutting edge 2 and the lower cutting edge 3 are installed in the periphery section of each of drums 4 and 5 with the rotary type cutting equipment 1 as [shown in drawing 9]. When the upper cutting edge 2 and the lower cutting edge 3 of these are a spiral cutting edge with which inclination arrangement of those longitudinal directions was carried out to the shaft orientations of drums 4 and 5, one point of the longitudinal direction of the upper cutting edge 2 and the lower cutting edge 3 gears and a base material 6 is cut, the clearance is set up between the upper cutting edge 2 at the time of engagement, and the lower cutting edge 3. In addition, Sign gamma shows angle of torsion of the upper cutting edge 2 which is a spiral cutting edge, and the lower cutting edge 3.

[0004]

[Problem(s) to be Solved by the Invention] However, as mentioned above, if the clearance is generated between the upper cutting edge at the time of tabling, and the lower cutting edge, sharpness will worsen and it will be easy to generate swarf (paper powder).

[0005] For example, when a base material is a thermal paper, since sharpness worsens, a cutting part will wear and color. Moreover, when a base material is roentgen paper, sharpness will worsen and a sensitization agent will exfoliate. Furthermore, in the case of the binder paper in which the base material applied the binder, a base material and a binder will become a lump, it will adhere to an upper cutting edge or a lower cutting edge, this lump will be omitted after that, and it will adhere among two or more sheets of papers before and behind cutting.

[0006] The technical problem of this invention is to offer the cutting equipment which can prevent generating of swarf etc. while it is made in consideration of an above-mentioned situation and can make sharpness of a base material good.

[0007]

[Means for Solving the Problem] In the cutting equipment with which invention according to claim 1 cuts a base material because the cutting edge of a pair engages those edge of a blade gradually to the longitudinal direction of the above-mentioned cutting edge with the cutting edge of the above-mentioned pair Cutting-edge guidance admission into a club is prepared in the location which gears with the edge of a blade of the cutting edge of above-mentioned another side to the beginning. This cutting-edge guidance admission into a club It is made to show around, while making the cutting edge of above-mentioned another side bend and transform in the direction of edge thickness and giving the contact pressure force in which it can contact to

the cutting edge of this another side, to the cutting edge of the method Norikazu in order to contact the edge of a blade of the cutting edge of this another side to the edge of a blade of the method of top Norikazu.

[0008] Invention according to claim 2 is cutting equipment of the rotary type which installed the cutting edge in the periphery section of each of the drum of a pair which the above-mentioned cutting equipment rotates to an opposite direction in invention according to claim 1, and it is made for the above-mentioned cutting edge to be a spiral cutting edge with which inclination arrangement of the longitudinal direction was carried out to the shaft orientations of the above-mentioned drum.

[0009] Invention according to claim 1 or 2 has the next operation. Since the cutting-edge guidance admission into a club prepared in one cutting edge makes the cutting edge of another side bend and transform in the direction of edge thickness and gives the contact pressure force in which it can contact to the cutting edge of this another side, to one cutting edge, cutting of a base material with these cutting edges is carried out under the contact condition of these cutting edges. For this reason, while being able to make sharpness of a base material good, a double-edged sword can be ground mutually and generating of the swarf produced when a double-edged sword has a clearance and cuts a base material further can be prevented.

[0010] Moreover, since it shows around so that the above-mentioned cutting-edge guidance admission into a club may contact the edge of a blade of the cutting edge of another side to the edge of a blade of one cutting edge, a double-edged contact condition can be smoothly guided by cutting-edge guidance admission into a club, and a double-edged chip can be prevented.

[0011]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 is the front view showing the cutting equipment of the rotary type with which the gestalt of operation of the 1st of the cutting equipment concerning this invention was applied. Drawing 2 is II-II of drawing 1. It is the sectional view which meets a line. Drawing 3 is the sectional view expanding and showing a part of drawing 2. Drawing 4 (A) is the front view showing the drum equipped with the upper cutting edge of drawing 1, and drawing 4 (B) is IV view Fig. of drawing 4 (A). Drawing 5 shows some upper cutting edges of drawing 4, (A) is a top view and (C) is [(B) is a side elevation and] rear view. Drawing 6 shows the guide member of drawing 4, (A) is a top view and (C) is [(B) is a side elevation and] rear view. Drawing 7 is the Fig. of operation showing tabling actuation with the upper cutting edge of drawing 3, and a guide member and a lower cutting edge.

[0012] The pivots 12A and 12B of the vertical pair by which both-ends immobilization was carried out to the stand 11, respectively as rotary type cutting equipment 10 was shown in drawing 1. The hollow drums 13 and 14 of a vertical pair which are supported free [rotation] through the bearing which is not illustrated to each of each pivots 12A and 12B, and rotate to an opposite direction mutually, It is fixed to the periphery section of each drums 13 and 14, respectively, and it has the upper cutting edge 15 and the lower cutting edge 16 which get into gear mutually at the time of rotation of both the drums 13 and 14, and the driving gear 17 made to rotate both the drums 13 and 14, and is constituted.

[0013] Attachment support is carried out at the support hole 18 prepared in the stand 11, and each both ends of the up-and-down pivots 12A and 12B are being fixed to the stand 11 through the fixed plate 19 which fixed to those both-ends sides. Thereby, both-ends immobilization of the up-and-down pivots 12A and 12B is carried out to a stand 11.

[0014] The up-and-down hollow drums 13 and 14 are supported by the periphery section of the pivots 12A and 12B which correspond, respectively free [rotation] through two or more pairs of bearings (not shown). Moreover, the follower gears 20A and 20B are fixed to the both-ends side of the hollow drums 13 and 14, and each follower gears 20A and 20B are supported free [rotation] by the pivots 12A and 12B which correspond through a pair each of bearings (not shown). Follower gear 20B fixed to the both ends of a drum 14 gears with follower gear 20A fixed to the both ends of a drum 13 mutually, and, thereby, makes pivotable the drum 13 and the drum 14 of each other in the opposite direction.

[0015] Although the upper cutting edge 15 and the lower cutting edge 16 are explained in full

detail behind, it is fixed to the taking-a-seat side 21 established in the longitudinal direction of the periphery section of the drums 13 and 14 which correspond to drawing 1, respectively so that it may be shown with Bolts 22A and 22B, and they get into gear like the above-mentioned at the time of rotation of both the drums 13 and 14.

[0016] The driving gear 17 shown in drawing 1 corresponds to the both ends of a drum 13. It corresponds to both ends, two drums, AC servo motor 23A and a drum 14. It has two-set of AC servo motors 23B, and is constituted. Each motors 23A and 23B are fixed to a stand 11, and the output shaft 24 of each motors 23A and 23B is supported by the stand 11 through bearing 25.

[0017] Drive gear 26A which gears to the above-mentioned follower gear 20A is fixed to the output shaft 24 of both motor 23A. Drive gear 26B which gears to the above-mentioned follower gear 20B is fixed to the output shaft 24 of both motor 23B. Motorised and one set are made into Maine and they are others. Three sets are made into a helper and it is the same torque command as the Maine motor. Four sets of coincidence drives are performed. Thereby, the drive of both the drums 13 and 14 makes securable synchronous rotation which becomes symmetrical with four directions and does not have torsion covering the overall length of both the drums 13 and 14.

[0018] As the above top cutting edge 15 and the lower cutting edge 16 are shown in drawing 1, drawing 2, and drawing 4, it is the spiral cutting edge with which inclination arrangement of the longitudinal direction of these cutting edges was carried out at each shaft orientations of the hollow drums 13 and 14, and the location of each longitudinal direction both-ends side of the upper cutting edge 15 and the lower cutting edge 16 is unevenly distributed only for angle-of-torsion gamma in the hoop direction of the hollow drums 13 and 14. Therefore, by rotation of an opposite direction, the upper cutting edge 15 and the lower cutting edge 16 get into gear gradually from the end of a longitudinal direction, and cut the base material 27 of each other crosswise [of the hollow drums 13 and 14] which intersects perpendicularly in the conveyance direction A. Here, the upper cutting edge 15 consists of cemented carbide, and the lower cutting edge 16 consists of tool steel.

[0019] As shown in the above top cutting edge 15 at drawing 5, suitably, two or more long holes 28 as a bolt insertion hole penetrate to the longitudinal direction, it is formed in it at spacing, and two or more formation of the seat 29 is carried out in the location which faces these long holes 28 at a cavity configuration. Moreover, two or more drilling of the female screw hole 30 is carried out at the tooth-back section 33 of the upper cutting edge 15. Besides, a cutting edge 15 is fixed to the taking-a-seat side 21 of the hollow drum 13 by making bolt 22A insert in a long hole 28, and making this bolt 22A screw in the hollow drum 13, as shown in drawing 2. At this time, the head of bolt 22A is held in the seat 29.

[0020] Moreover, the push bolt 31 and two or more length bolts 32 are ****(ed) by turns by the hollow drum 13 in accordance with the shaft orientations of the hollow drum 13 to the taking-a-seat side 21 neighborhood. The tip of the push bolt 31 contacts the tooth-back section 33 of the upper cutting edge 15, and the point of the length bolt 32 is screwed in the female screw hole 30 of the upper cutting edge 15. Where bolt 22A is loosened; the edge of a blade 34 of the upper cutting edge 15 is extruded with the push bolt 31, and the edge of a blade 34 of the upper cutting edge 15 is lengthened with the length bolt 32, and tabling with the edge of a blade 34 of this upper cutting edge 15 and the edge of a blade 35 of the lower cutting edge 16 is adjusted. Bolt 22A is bound tight after this adjustment, and the upper cutting edge 15 is fixed to the hollow drum 13.

[0021] The bottom cutting edge 16 of the above is a cross-section wedge-like, as shown in drawing 3, and end face section 16A is pressed by the taper side 37 of the arbor block 36 by bolting of bolt 22B, and is fixed to the taking-a-seat side 21 of the hollow drum 14. While two or more bolt insertion holes 38 are penetrated and drilled in the longitudinal direction of this arbor block 36 by the above-mentioned arbor block 36, two or more formation of the seat 39 is carried out in the location which faces this bolt insertion hole 38. By inserting bolt 22B in the bolt insertion hole 38, and binding tight and screwing it in the hollow drum 14, the taper side 37 of the arbor block 36 carries out press immobilization of the end face section 16A of the lower cutting edge 16 like ****. At this time, the head of bolt 22B is held in the seat 39 of the arbor block 36.

[0022] In the condition that the section 16A was fixed to the hollow drum 14 through the arbor block 36, point 16B in the bottom cutting edge 16 of the above bends in the direction of edge thickness of the lower cutting edge 16, and is prepared deformable. That is, although located in the two-dot chain line location (location where the front face 44 of the lower cutting edge 16 contacts the hollow drum 14) of drawing 3 in the condition that point 16B of the lower cutting edge 16 is not guided at the guide member 40 of the after-mentioned [the edge of a blade 35], and it is not in contact with the upper cutting edge 15. It bends and deforms into the rear-face 45 side of this lower cutting edge 16 in the direction of edge thickness of the lower cutting edge 16 to the continuous-line location of drawing 3 in the condition of the edge of a blade 35 having been guided at the guide member 40, or having geared with the upper cutting edge 15.

[0023] The above-mentioned guide member 40 functions as cutting-edge guidance admission into a club, and as shown in drawing 4 – drawing 6, it is installed in the location which gears to the lower cutting edge 16 and the beginning in the upper cutting edge 15. The attachment crevice 41 is formed in the location which gears with the upper cutting edge 15 at the lower cutting edge 16 and the beginning, fitting of the guide member 40 is carried out to this attachment crevice 41, and it is fixed to the upper cutting edge 15 with the bolt which is not illustrated.

[0024] That guide side 42 bends, and makes the guide member 40 transform point 16B of this lower cutting edge 16 into that rear-face 45 side in the direction of edge thickness of the lower cutting edge 16 like *** by consisting of cemented carbide in contact with the edge of a blade 35 of the lower cutting edge 16 at the time of rotation of the hollow drums 13 and 14, and the contact pressure force in which the upper cutting edge 15 can be contacted as reaction force of bending deformation is given to point 16B of this lower cutting edge 16. Furthermore, this guide member 40 is guided so that this point 16B may be contacted to the edge of a blade 34 of the upper cutting edge 15 along the guide side 42, while giving the above-mentioned contact pressure force to point 16B of the lower cutting edge 16.

[0025] Next, an operation of the cutting equipment 10 which equipped the upper cutting edge 15 with the guide member 40 is explained. If the hollow drums 13 and 14 rotate to an opposite direction mutually by the rotation drive of AC servo motors 23A and 23B, the upper cutting edge 15 and the lower cutting edge 16 will cut a base material 27 by engaging gradually these edge of a blade 34 and 35 to the longitudinal direction of the upper cutting edge 15 and the lower cutting edge 16.

[0026] Since the guide member 40 was installed in the location which gears with the upper cutting edge 15 at the lower cutting edge 16 and the beginning at this time, the edge of a blade 35 of the lower cutting edge 16 As shown in drawing 7 (A) and (B), the guide side 42 of the guide member 40 is contacted, and while point 16B of the lower cutting edge 16 is bent and transformed into the rear-face 45 side of the lower cutting edge 16 in the direction of edge thickness, it shows around along the guide side 42 to the edge of a blade 34 of the upper cutting edge 15.

[0027] Although the edge of a blade 35 of the lower cutting edge 16 gears to the edge of a blade 34 of the upper cutting edge 15 soon as shown in drawing 7 (C), since the lower cutting edge 16 bends and is transformed by it at this time, the contact pressure force in which the edge of a blade 34 of the upper cutting edge 15 can be contacted as reaction force of bending deformation is given to the edge of a blade 35 of the lower cutting edge 16, and it cuts a base material 27 in this condition.

[0028] With rotation of the hollow drums 13 and 14, as shown in drawing 7 R> 7 (D) and (E), the edge of a blade 35 of the lower cutting edge 16 separates from the edge of a blade 34 of the upper cutting edge 15, slides along the polished surface 43 of the upper cutting edge 15, soon, as shown in drawing 7 (F), is completely separated from the upper cutting edge 15, and ends cutting of a base material 27. A base material 27 is carried out in this way, and is cut gradually crosswise which intersects perpendicularly in the conveyance direction A of a base material 27 (drawing 2) with the upper cutting edge 15 and the lower cutting edge 16.

[0029] According to the gestalt of the above-mentioned implementation, the following

effectiveness is done so.

** Since the guide member 40 prepared in the top cutting edge 15 is made to bend and transform the lower cutting edge 16 in the direction of edge thickness, bends with this lower cutting edge 16 and gives the contact pressure force in which it can contact, to the upper cutting edge 15 as reaction force of deformation, cutting of the base material 27 with the upper cutting edge 15 and the lower cutting edge 16 of these is carried out under the contact condition of the upper cutting edge 15 of these, and the lower cutting edge 16. For this reason, while being able to make sharpness of a base material 27 good, the upper cutting edge 15 and the lower cutting edge 16 can be ground mutually, and generating of the swarf produced when the upper cutting edge 15 and the lower cutting edge 16 have a clearance and cut a base material 27 further can be prevented.

[0030] For example, since the sharpness of a base material 27 is good, the sensitization agent which this thermal paper did not color when a base material 27 was a thermal paper, and was applied to this roentgen paper when a base material 27 was roentgen paper does not exfoliate. Moreover, since generating of swarf can be prevented, when a base material 27 is binder paper, the lump which the paper powder and the binder as swarf combined adheres to the upper cutting edge 15 or the lower cutting edge 16, and does not adhere to the binder paper before and behind dedropping and cutting.

[0031] ** Since it shows around again so that the guide side 42 of the above-mentioned guide member 40 may contact the edge of a blade 35 of the lower cutting edge 16 to the edge of a blade 34 of the upper cutting edge 16, the contact condition of the upper cutting edge 15 and the lower cutting edge 16 can be smoothly guided in respect of [42] the guide of the guide member 40, and the chip of the upper cutting edge 15 and the lower cutting edge 16 can be prevented.

[0032] Drawing 8 is an expanded sectional view corresponding to drawing 3 in the cutting equipment of the rotary type with which the gestalt of operation of the 2nd of the cutting equipment concerning this invention was applied. In the gestalt of this 2nd operation, the same part as the gestalt of said 1st operation omits explanation by attaching the same sign.

[0033] With the rotary type cutting equipment 50 in the gestalt of this 2nd operation, the lower cutting edge 51 is the shape not of a wedge but a flat-surface configuration, and the wedge-shaped presser-foot plate 52 intervenes between this lower cutting edge 51 and the arbor block 36. A crevice 53 is formed in the rear-face side of the lower cutting edge 51, it presses down to this crevice 53, and fitting of the heights 54 of a plate 52 is enabled.

[0034] By the taper side 37 of the arbor block 36 pressing down, and pressing the taper side 57 of a plate 52, the heights 54 of the presser-foot plate 52 fit into the crevice 53 of the lower cutting edge 51 firmly, and press immobilization of the end face section 51A of the lower cutting edge 51 is carried out in bolt 22B through the presser-foot plate 52 and the arbor block 36 at the hollow drum 14. Point 51B of the lower cutting edge 51 is bent by this condition in the direction of edge thickness of the lower cutting edge 51, and is prepared deformable in it.

[0035] That is, while it is not shown to the edge of a blade 35 of the lower cutting edge 51 to point 51B of the lower cutting edge 51 at the guide member 40 and is not in contact with the upper cutting edge 15 While it is in the location (location where the front face 55 of the lower cutting edge 51 contacts the hollow drum 14) shown in the two-dot chain line in drawing 8 , and the edge of a blade 35 of the lower cutting edge 51 is guided in the guide side 42 of the guide member 40 or it is in contact with the upper cutting edge 15 It is in the location shown in the continuous line in drawing 8 , and in the direction of edge thickness of the lower cutting edge 51, it bends and deforms into the rear-face 56 side of this lower cutting edge 51.

[0036] Therefore, also in this cutting equipment 50, since the guide member 40 prepared in the upper cutting edge 15 bends, is made to transform point 51B of the lower cutting edge 51, bends with this lower cutting edge 51 and gives the contact pressure force in which it can contact, to the upper cutting edge 15 as reaction force of deformation, while being able to cut the base material 27 with the upper cutting edge 15 and the lower cutting edge 51 of these in sharpness fitness, generating of swarf can be prevented. Moreover, since the guide side 42 of the guide member 40 shows the edge of a blade 35 of the lower cutting edge 51 to the edge of a blade 34

of the upper cutting edge 15. The wear of the upper cutting edge 15 and the lower cutting edge 51 can also be prevented.

[0037] Furthermore, what is necessary is to use the presser-foot plate 52 and the arbor block 36 as it is, and to exchange only the lower cutting edge 51, since the lower cutting edge 51 as a substitute part is a flat-surface configuration and it differs from the shape of a heavy-gage wedge, if it is in this cutting equipment 50. For this reason, the cost of the lower cutting edge 51 can be reduced.

[0038] In addition, although the cutting equipments 10 and 50 stated the case where the upper cutting edge 15 and the lower cutting edges 16 and 51 were spiral cutting edges, with rotary type cutting equipment in the gestalt of both the above-mentioned implementation, also in the case of a parallel peripheral cutting edge [**** / those longitudinal directions / shaft orientations / of the hollow drums 13 and 14], the upper cutting edge 15 and the lower cutting edges 16 and 51 can apply this invention. Moreover, the hollow drum 13 may be equipped with the lower cutting edge 16, and you may equip with the upper cutting edge 15 which equipped the hollow drum 14 with the guide member 40.

[0039]

[Effect of the Invention] As mentioned above, according to the cutting equipment concerning this invention, generating of swarf etc. can be prevented while being able to make sharpness of a base material good.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Drawing 1 Drawing 1 is the front view showing the cutting equipment of the rotary type with which the gestalt of operation of the 1st of the cutting equipment concerning this invention was applied.

Drawing 2 Drawing 2 is II-II of drawing 1 . It is the sectional view which meets a line.

Drawing 3 Drawing 3 is the sectional view expanding and showing a part of drawing 2 .

Drawing 4 Drawing 4 (A) is the front view showing the drum equipped with the upper cutting edge of drawing 1 , and drawing 4 (B) is IV view Fig. of drawing 4 (A).

Drawing 5 Drawing 5 shows some upper cutting edges of drawing 4 , (A) is a top view and (C) is [(B) is a side elevation and] rear view.

Drawing 6 Drawing 6 shows the guide member of drawing 4 , (A) is a top view and (C) is [(B) is a side elevation and] rear view.

Drawing 7 Drawing 7 is the Fig. of operation showing tabling actuation with the upper cutting edge of drawing 3 , and a guide member and a lower cutting edge.

Drawing 8 Drawing 8 is an expanded sectional view corresponding to drawing 3 in the cutting equipment of the rotary type with which the gestalt of operation of the 2nd of the cutting equipment concerning this invention was applied.

Drawing 9 Drawing 9 (A) is the front view showing cutting equipment conventional rotary type, and drawing 9 (B) is IX view Fig. appearance of drawing 9 (A).

[Description of Notations]

10 Cutting Equipment

13 14 Hollow drum

15 Upper Cutting Edge

16 Lower Cutting Edge

16A The end face section of a lower cutting edge

16B The point of a lower cutting edge

27 Base Material

34 Edge of a Blade of Upper Cutting Edge

35 Edge of a Blade of Lower Cutting Edge

40 Guide Member (Cutting-Edge Guidance Admission into a Club)

42 Guide Side

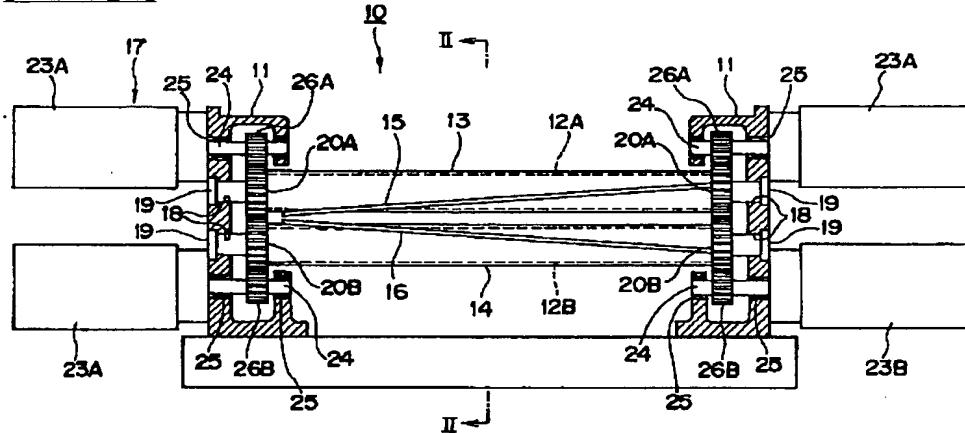
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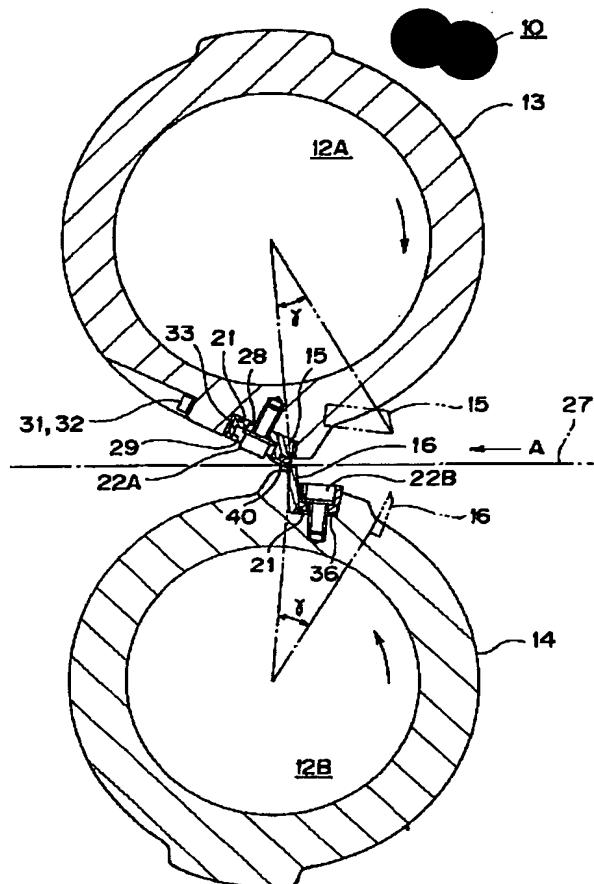
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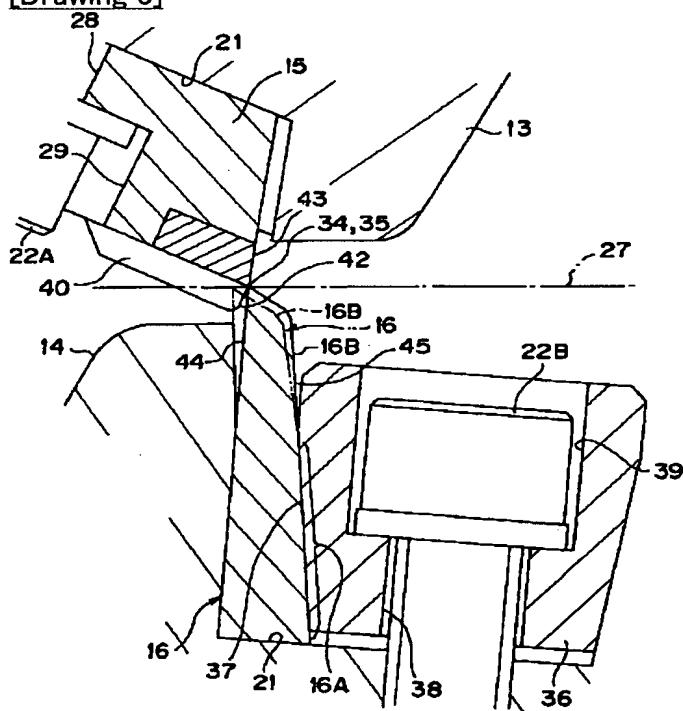
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DRAWINGS

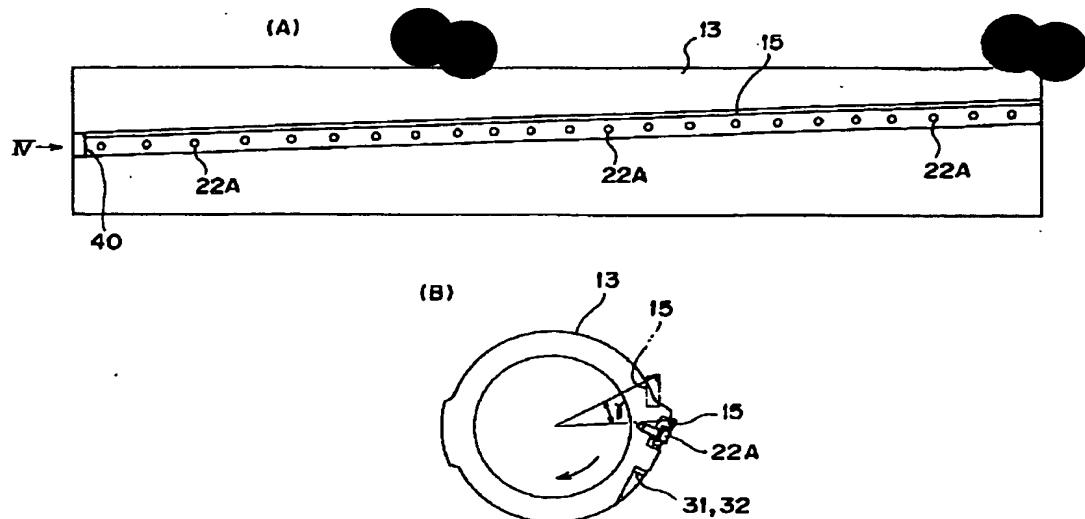
[Drawing 1]**[Drawing 2]**



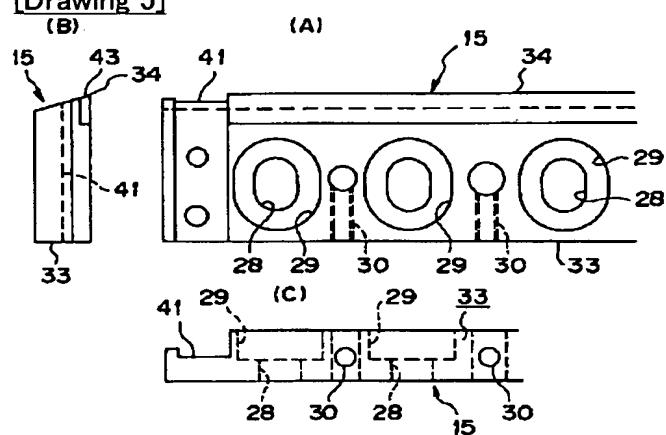
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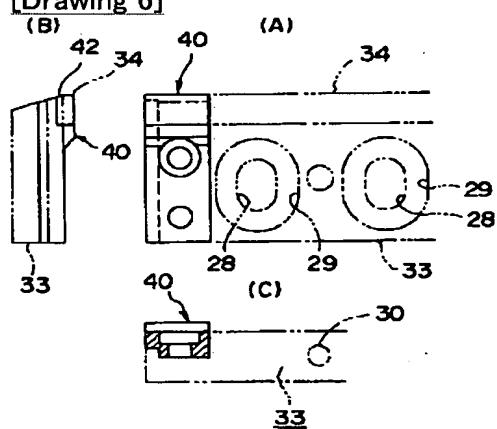
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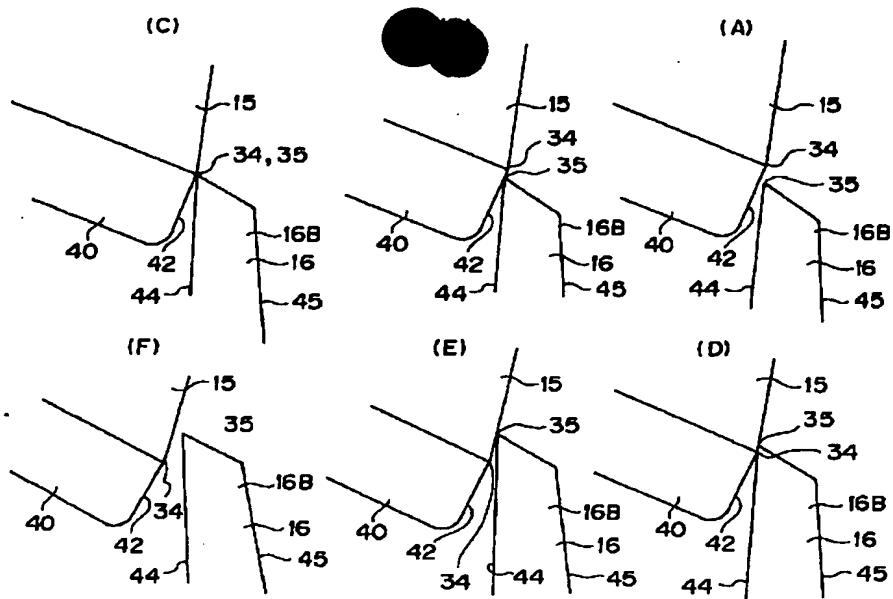
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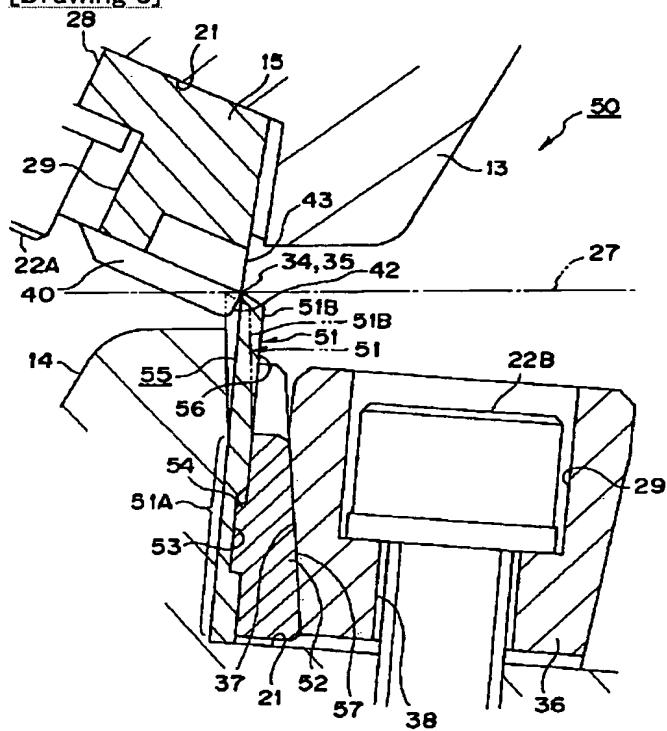
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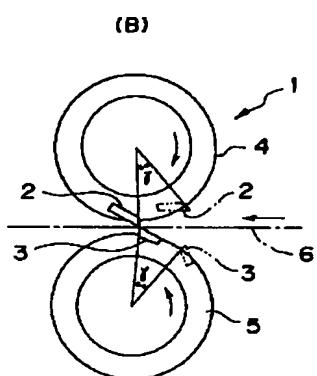
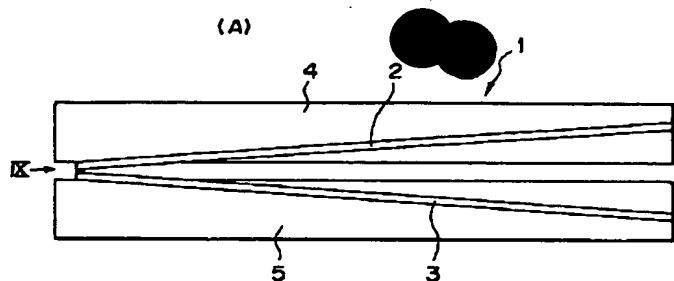
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]

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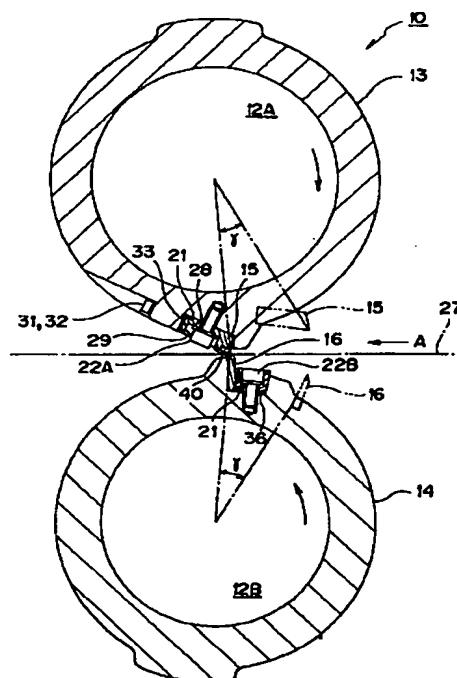
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(54)【発明の名称】 切断装置

(57)【要約】

【課題】 基材の切れ味を良好にできるとともに、切屑の発生等も防止できるようにすること。

【解決手段】 一対の上刃15、下刃16が、それらの刃先34、35を刃の長手方向に漸次噛み合わせることで基材27を切断する切断装置10において、上刃には、下刃の刃先と最初に噛み合う位置にガイド部材40が設けられ、このガイド部材は、下刃を刃厚方向に撓み変形させてこの下刃に上刃に対し接触可能な接圧力を付与するとともに、この下刃の刃先を上刃の刃先に接触させるべく案内するものである。



【特許請求の範囲】

【請求項1】 一対の刃が、それらの刃先を上記刃の長手方向に漸次噛み合せて基材を切断する切断装置において、

上記一対の刃には、上記他方の刃の刃先と最初に噛み合う位置に刃先導入部が設けられ、

この刃先導入部は、上記他方の刃を刃厚方向に撓み変形させてこの他方の刃に上記一方の刃に対し接触可能な接圧力を付与するとともに、この他方の刃の刃先を上記一方の刃先に接触させるべく案内することを特徴とする切断装置。

【請求項2】 上記切断装置は、互いに反対方向に回転する一対のドラムのそれぞれの外周部に刃を設置したロータリータイプの切断装置であり、上記刃は、その長手方向が上記ドラムの軸方向に対し傾斜配置されたスパイラル刃である請求項1に記載の切断装置。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】 本発明は、板紙や鉄板等の基材を切断する切断装置に関する。

【0002】

【従来の技術】 上刃と下刃とを噛み合わせることにより板紙や鉄板等の基材を切断する切断装置では、一般に、金属刃である上刃と下刃とが接触して欠けることを防止するために、噛み合わせ時の両刃間に隙間が設定されている。

【0003】 例えば、図9に示すようなロータリータイプの切断装置1で、上刃2、下刃3がドラム4、5のそれぞれの外周部に設置され、これらの上刃2及び下刃3が、それらの長手方向がドラム4及び5の軸方向に対し傾斜配置されたスパイラル刃である場合にも、上刃2と下刃3の長手方向の一点が噛み合って基材6を切断するときに、噛み合い時の上刃2及び下刃3間に隙間が設定されている。尚、符号γは、スパイラル刃である上刃2、下刃3のねじれ角を示す。

【0004】

【発明が解決しようとする課題】 ところが、上述のように、噛み合わせ時の上刃と下刃との間に隙間が生じていると、切れ味が悪くなり、切屑（紙粉）が発生し易い。

【0005】 例えば、基材が感熱紙の場合は、切れ味が悪くなることから切断箇所がこすれて発色してしまう。また、基材がレントゲン紙の場合には、切れ味が悪くなつて感光剤が剥離してしまう。更に、基材が粘着剤を塗布した粘着剤紙の場合には、基材と粘着剤とが塊となって上刃或いは下刃に付着し、その後この塊が脱落して、切斷前後の複数枚の紙の間に付着してしまう。

【0006】 本発明の課題は、上述の事情を考慮してなされたものであり、基材の切れ味を良好にできるとともに、切屑の発生等を防止できる切断装置を提供することにある。

【0007】

【課題を解決するための手段】 請求項1に記載の発明は、一対の刃が、それらの刃先を上記刃の長手方向に漸次噛み合せて基材を切断する切断装置において、上記一対の刃には、上記他方の刃の刃先と最初に噛み合う位置に刃先導入部が設けられ、この刃先導入部は、上記他方の刃を刃厚方向に撓み変形させてこの他方の刃に上記一方の刃に対し接触可能な接圧力を付与するとともに、この他方の刃の刃先を上記一方の刃先に接触させるべく案内するようにしたものである。

【0008】 請求項2に記載の発明は、請求項1に記載の発明において、上記切断装置は、互いに反対方向に回転する一対のドラムのそれぞれの外周部に刃を設置したロータリータイプの切断装置であり、上記刃は、その長手方向が上記ドラムの軸方向に対し傾斜配置されたスパイラル刃であるようにしたものである。

【0009】 請求項1又は2に記載の発明には、次の作用がある。一方の刃に設けられた刃先導入部が他方の刃を刃厚方向に撓み変形させて、この他方の刃に一方の刃に対し接触可能な接圧力を付与することから、これらの刃による基材の切断はこれらの刃の接触状態下で実施される。このため、基材の切れ味を良好にできるとともに、両刃を相互に研磨でき、更に、両刃が隙間を有して基材を切断する場合に生ずる切屑の発生を防止できる。

【0010】 また、上記刃先導入部が他方の刃の刃先を一方の刃の刃先へ接触させるべく案内するので、両刃の接触状態を刃先導入部にて滑らかに案内でき、両刃の欠けを防止できる。

【0011】

【発明の実施の形態】 以下、本発明の実施の形態を、図面に基づいて説明する。図1は、本発明に係る切断装置の第1の実施の形態が適用されたロータリータイプの切断装置を示す正面図である。図2は、図1のII-II線に沿う断面図である。図3は、図2の一部を拡大して示す断面図である。図4(A)は、図1の上刃を装着したドラムを示す正面図であり、図4(B)は、図4(A)のIV矢視図である。図5は、図4の上刃の一部を示し、(A)は平面図であり、(B)は側面図であり、(C)は背面図である。図6は、図4のガイド部材を示し、(A)は平面図であり、(B)は側面図であり、(C)は背面図である。図7は、図3の上刃及びガイド部材と下刃との噛み合わせ動作を示す動作図である。

【0012】 ロータリータイプの切断装置10は、図1に示す如く、架台11に対しそれぞれ両端固定された上下一対の支軸12A、12Bと、各支軸12A、12Bのそれぞれに図示しないベアリングを介して回転自在に支持され、互いに反対方向に回転する上下一対の中空ドラム13、14と、各ドラム13、14の外周部にそれぞれ固定され、両ドラム13、14の回転時に互いに噛み合う上刃15、下刃16と、両ドラム13、14を回

転させる駆動装置17とを有して構成されている。

【0013】上下の支軸12A、12Bの各両端部は、架台11に設けた支持孔18に嵌着支持され、それらの両端面に固着された固定プレート19を介して架台11に固定されている。これにより、上下の支軸12A、12Bは、架台11に対し両端固定される。

【0014】上下の中空ドラム13、14は、それぞれ対応する支軸12A、12Bの外周部に、複数対のペアリング（図示せず）を介して回転自在に支持される。また、中空ドラム13、14の両端面には従動ギヤ20A、20Bが固定され、各従動ギヤ20A、20Bは、各一对のペアリング（図示せず）を介して対応する支軸12A、12Bに回転自在に支持される。ドラム13の両端に固定される従動ギヤ20Aと、ドラム14の両端に固定された従動ギヤ20Bとは互いに噛み合い、これにより、ドラム13とドラム14とを互いに反対方向に回転可能としている。

【0015】上刃15、下刃16は、後に詳説するが、図2に示すように、それぞれ対応するドラム13、14の外周部の長手方向に設けた着座面21にボルト22A、22Bにより固定され、前述の如く、両ドラム13、14の回転時に噛み合う。

【0016】図1に示す駆動装置17は、ドラム13の両端に対応する2台のACサーボモータ23Aと、ドラム14の両端に対応する2台のACサーボモータ23Bとを有して構成される。各モータ23A、23Bは架台11に固定され、各モータ23A、23Bの出力軸24はペアリング25を介して架台11に支持される。

【0017】両モータ23Aの出力軸24には、前述の従動ギヤ20Aに噛み合う駆動ギヤ26Aが固定される。両モータ23Bの出力軸24には、前述の従動ギヤ20Bに噛み合う駆動ギヤ26Bが固定される。モータ駆動は、1台をメインとし、他の3台をヘルパとし、メインモータと同じトルク指令により4台の同時駆動を行なっている。これにより、両ドラム13、14の駆動は、上下左右対称となり、両ドラム13、14の全長にわたってねじれのない同期回転を確保可能としている。

【0018】上記上刃15、下刃16は、図1、図2及び図4に示すように、これらの刃の長手方向が中空ドラム13、14のそれぞれの軸方向に傾斜配置されたスパイラル刃であり、上刃15及び下刃16のそれぞれの長手方向両端面の位置が、中空ドラム13、14の周方向においてねじれ角γだけ偏在している。従って、中空ドラム13及び14の互いに反対方向の回転により、上刃15及び下刃16は、長手方向の一端から漸次噛み合い、基材27をその搬送方向Aに直交する幅方向に切断する。ここで、上刃15は超硬合金にて構成され、下刃16は工具鋼にて構成される。

【0019】上記上刃15には、図5に示すように、その長手方向に適宜間隔でボルト挿通孔としての長孔28

が複数貫通して形成され、これらの長孔28を臨む位置に座部29が、凹陷形状に複数形成される。また、上刃15の背面部33に、雌ねじ孔30が複数穿設される。この上刃15は、図2に示すように、長孔28にボルト22Aを挿通させ、このボルト22Aを中空ドラム13に螺合させることにより、中空ドラム13の着座面21に固定される。このとき、ボルト22Aの頭部が座部29内に収容される。

【0020】また、中空ドラム13には、着座面21付近に押しボルト31及び引きボルト32が、中空ドラム13の軸方向に沿い交互に複数本螺装されている。押しボルト31の先端が上刃15の背面部33に当接し、引きボルト32の先端部が上刃15の雌ねじ孔30に螺合される。ボルト22Aを緩めた状態で、押しボルト31により上刃15の刃先34を押し出し、又、引きボルト32により上刃15の刃先34を引いて、この上刃15の刃先34と下刃16の刃先35との噛合せを調整する。この調整後、ボルト22Aが締め付けられて、上刃15が中空ドラム13に固定される。

【0021】上記下刃16は、図3に示すように断面楔形状であり、基端部16Aが、ボルト22Bの締め付けによりアーバープロック36のテーパ面37に押圧されて、中空ドラム14の着座面21に固定される。上記アーバープロック36には、このアーバープロック36の長手方向に複数個のボルト挿通孔38が貫通して穿設されるとともに、このボルト挿通孔38を臨む位置に座部39が複数形成される。ボルト22Bがボルト挿通孔38に挿通され中空ドラム14に締め付け螺合されることにより、アーバープロック36のテーパ面37が上述の如く下刃16の基端部16Aを押圧固定する。このとき、ボルト22Bの頭部は、アーバープロック36の座部39内に収容される。

【0022】上記下刃16における先端部16Bは、基端部16Aがアーバープロック36を介して中空ドラム14に固定された状態において、下刃16の刃厚方向に撓み変形可能に設けられる。つまり、下刃16の先端部16Bは、刃先35が後述のガイド部材40に案内されず、且つ上刃15にも接触していない状態では、図3の二点鎖線位置（下刃16の表面44が中空ドラム14に当接する位置）に位置するが、刃先35がガイド部材40に案内され、又は上刃15に噛み合った状態で、図3の実線位置まで、下刃16の刃厚方向でこの下刃16の裏面45側へ撓み変形する。

【0023】上記ガイド部材40は刃先導入部として機能し、図4～図6に示すように、上刃15において下刃16と最初に噛み合う位置に設置される。上刃15には、下刃16と最初に噛み合う位置に取付凹部41が形成され、ガイド部材40はこの取付凹部41に嵌合され、図示しないボルトにて上刃15に固定される。

【0024】ガイド部材40は超硬合金にて構成され、

そのガイド面42が中空ドラム13及び14の回転時に、上述の如く下刃16の刃先35に当接してこの下刃16の先端部16Bを下刃16の刃厚方向でその裏面45側へ撓み変形させ、この下刃16の先端部16Bに、撓み変形の反力として上刃15に接触可能な接圧力を付与する。更に、このガイド部材40は、下刃16の先端部16Bに上述の接圧力を付与するとともに、この先端部16Bをガイド面42に沿って上刃15の刃先34に接触させるように案内する。

【0025】次に、上刃15にガイド部材40を備えた切断装置10の作用を説明する。ACサーボモータ23A、23Bの回転駆動により中空ドラム13及び14が互いに反対方向に回転すると、上刃15及び下刃16は、これらの刃先34及び35を、上刃15及び下刃16の長手方向に漸次噛み合わせることにより基材27を切断する。

【0026】このとき、上刃15には、下刃16と最初に噛み合う位置にガイド部材40が設置されたので、下刃16の刃先35は、図7(A)及び(B)に示すように、ガイド部材40のガイド面42に当接し、下刃16の先端部16Bが刃厚方向で下刃16の裏面45側に撓み変形されながら、ガイド面42に沿って上刃15の刃先34へ案内される。

【0027】下刃16の刃先35は、やがて、図7(C)に示すように上刃15の刃先34に噛み合うが、このとき、下刃16が撓み変形されているので、下刃16の刃先35は、撓み変形の反力として上刃15の刃先34に接触可能な接圧力を付与されており、この状態で基材27を切断する。

【0028】中空ドラム13及び14の回転に伴い、図7(D)及び(E)に示すように、下刃16の刃先35は、上刃15の刃先34から離れて上刃15の研磨面43に沿って摺動し、やがて、図7(F)に示すように、上刃15から完全に離れて基材27の切断を終了する。基材27は、このようにして、上刃15及び下刃16により基材27の搬送方向A(図2)に直交する幅方向に漸次切断される。

【0029】上記実施の形態によれば、次の効果を奏する。

①上刃15に設けられたガイド部材40が下刃16を刃厚方向に撓み変形させて、この下刃16に撓み変形の反力として上刃15に対し接触可能な接圧力を付与することから、これらの上刃15及び下刃16による基材27の切断は、これらの上刃15及び下刃16の接触状態下で実施される。このため、基材27の切れ味を良好にできるとともに、上刃15及び下刃16を相互に研磨でき、更に、上刃15及び下刃16が隙間を有して基材27を切断する場合に生ずる切屑の発生を防止できる。

【0030】例えば、基材27の切れ味が良好であることから、基材27が感熱紙の場合には、この感熱紙が発

色せず、また基材27がレントゲン紙の場合には、このレントゲン紙に塗布された感光剤が剥離しない。また、切屑の発生を防止できることから、基材27が粘着剝紙の場合には、切屑としての紙粉と粘着剝紙とが結合した塊が上刃15或いは下刃16に付着して脱落し、切断前後の粘着剝紙に付着することがない。

【0031】②また、上記ガイド部材40のガイド面42が下刃16の刃先35を上刃15の刃先34へ接触させるべく案内するので、上刃15及び下刃16の接觸状態をガイド部材40のガイド面42にて滑らかに案内でき、上刃15及び下刃16の欠けを防止できる。

【0032】図8は、本発明に係る切断装置の第2の実施の形態が適用されたロータリータイプの切断装置における図3に対応する拡大断面図である。この第2の実施の形態において、前記第1の実施の形態と同様な部分は、同一の符号を付すことにより説明を省略する。

【0033】この第2の実施の形態におけるロータリータイプの切断装置50では、下刃51が楔形状ではなく平面形状であり、この下刃51とアーバーブロック36との間に、楔形状の押えプレート52が介在される。下刃51の裏面側には凹部53が形成され、この凹部53に押えプレート52の凸部54が嵌合可能とされる。

【0034】アーバーブロック36のテープ面37が押えプレート52のテープ面57を押圧することにより、押えプレート52の凸部54が下刃51の凹部53に強固に嵌合して、下刃51の基端部51Aが、押えプレート52及びアーバーブロック36を介し、ボルト22Bにて中空ドラム14に押圧固定される。この状態で、下刃51の先端部51Bは、下刃51の刃厚方向に撓み変形可能に設けられる。

【0035】つまり、下刃51の先端部51Bは、下刃51の刃先35がガイド部材40に案内されず、且つ上刃15にも接觸していないときに、図8中の二点鎖線に示す位置(下刃51の表面55が中空ドラム14に当接する位置)にあり、下刃51の刃先35がガイド部材40のガイド面42に案内され、又は上刃15に接觸しているときに、図8中の実線に示す位置にあって、下刃51の刃厚方向でこの下刃51の裏面56側へ撓み変形する。

【0036】従って、この切断装置50においても、上刃15に設けられたガイド部材40が下刃51の先端部51Bを撓み変形させて、この下刃51に撓み変形の反力として上刃15に対し接觸可能な接圧力を付与することから、これらの上刃15及び下刃51による基材27の切断を切れ味良好に実施できるとともに、切屑の発生を防止できる。また、ガイド部材40のガイド面42が下刃51の刃先35を上刃15の刃先34へ案内するから、上刃15と下刃51の欠けも防止できる。

【0037】更に、この切断装置50にあっては、交換部品としての下刃51が平面形状であり、厚肉の楔形状

と異なるので、押えプレート 52 及びアーバープロック 36 をそのまま使用し、下刃 51 のみを交換すればよい。このため、下刃 51 のコストを低減できる。

【0038】尚、上記両実施の形態では、切断装置 10、50 がロータリータイプの切断装置で、上刃 15 及び下刃 16、51 がスパイラル刃である場合を述べたが、上刃 15 及び下刃 16、51 が、それらの長手方向が中空ドラム 13 及び 14 の軸方向に平衡なストレート刃の場合にも本発明を適用できる。また、中空ドラム 13 に下刃 16 を装着し、中空ドラム 14 に、ガイド部材 40 を備えた上刃 15 を装着しても良い。

【0039】

【発明の効果】以上のように、本発明に係る切断装置によれば、基材の切れ味を良好にできるとともに、切屑の発生等も防止できる。

【図面の簡単な説明】

【図1】図1は、本発明に係る切断装置の第1の実施の形態が適用されたロータリータイプの切断装置を示す正面図である。

【図2】図2は、図1のII-II線に沿う断面図である。

【図3】図3は、図2の一部を拡大して示す断面図である。

【図4】図4(A)は、図1の上刃を装着したドラムを示す正面図であり、図4(B)は、図4(A)のIV矢視図である。

【図5】図5は、図4の上刃の一部を示し、(A)は平

面図であり、(B)は側面図であり、(C)は背面図である。

【図6】図6は、図4のガイド部材を示し、(A)は平面図であり、(B)は側面図であり、(C)は背面図である。

【図7】図7は、図3の上刃及びガイド部材と下刃との噛み合わせ動作を示す動作図である。

【図8】図8は、本発明に係る切断装置の第2の実施の形態が適用されたロータリータイプの切断装置における図3に対応する拡大断面図である。

【図9】図9(A)は、従来のロータリータイプの切断装置を示す正面図であり、図9(B)は、図9(A)のIX矢視図である。

【符号の説明】

10 切断装置

13、14 中空ドラム

15 上刃

16 下刃

16A 下刃の基端部

20 16B 下刃の先端部

27 基材

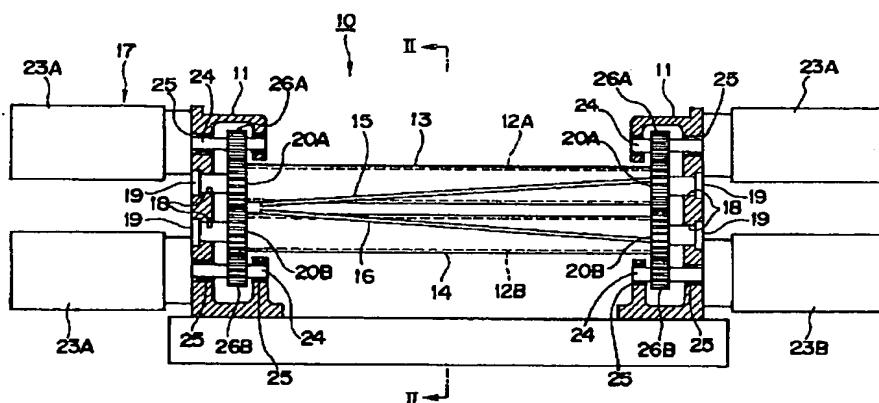
34 上刃の刃先

35 下刃の刃先

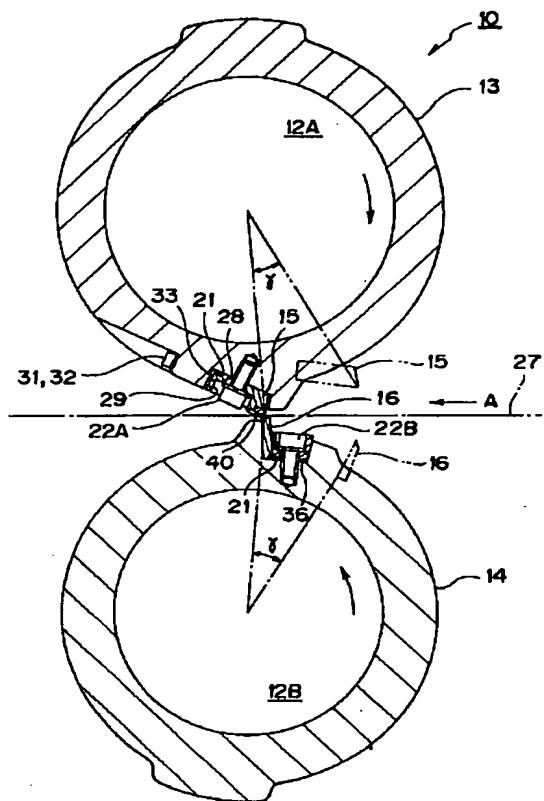
40 ガイド部材(刃先導入部)

42 ガイド面

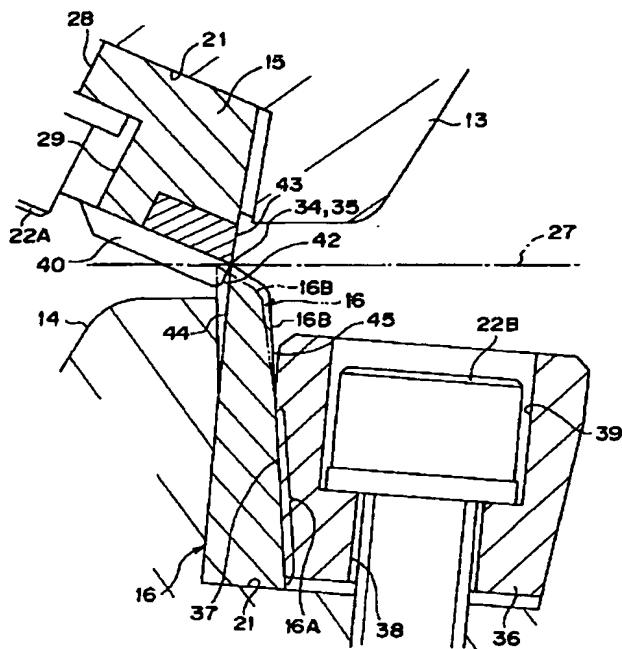
【図1】



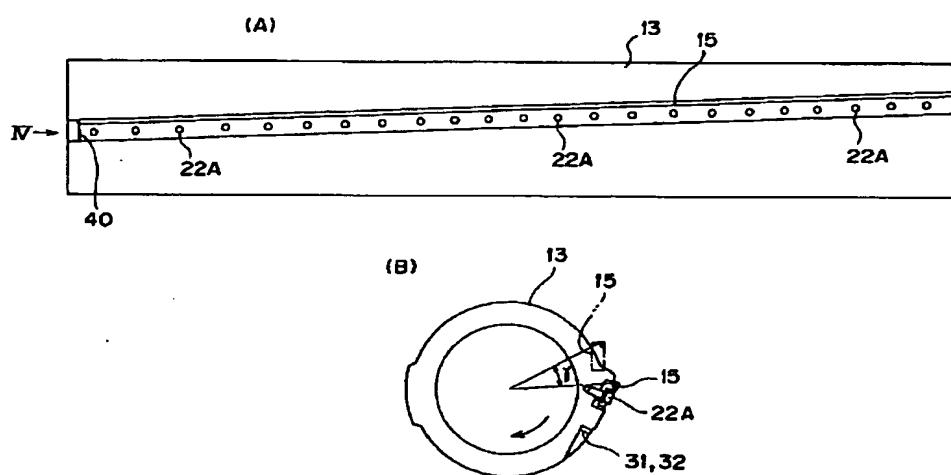
【図2】



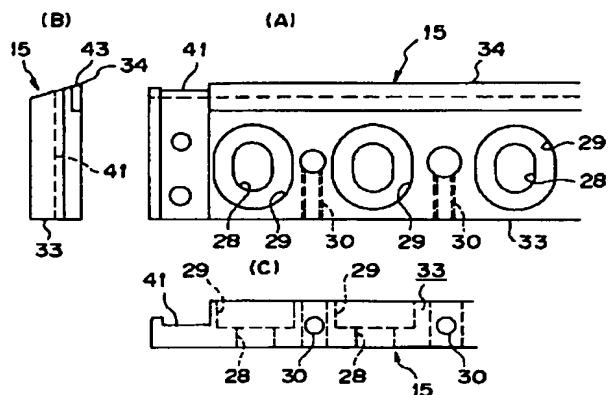
【図3】



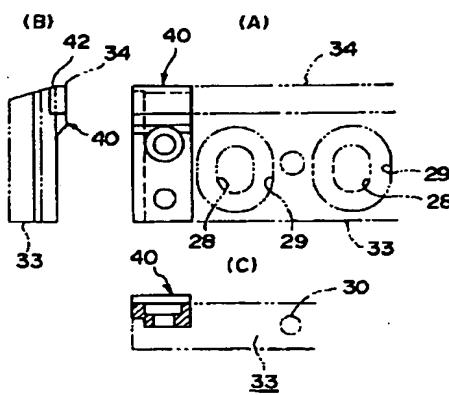
【図4】



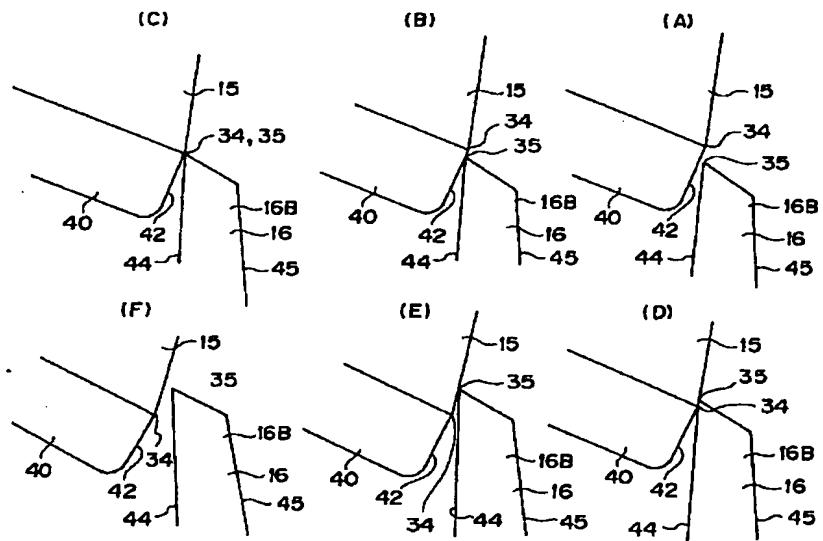
【図5】



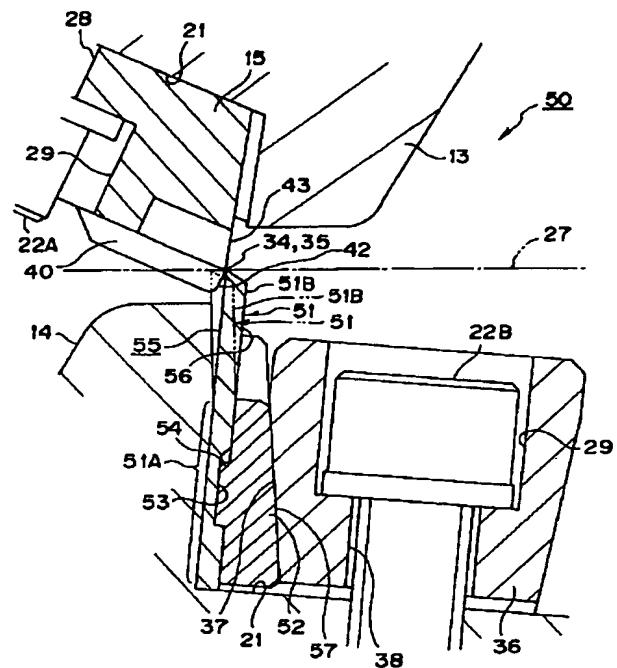
【図6】



【図7】



【図8】



【図9】

